The Future of Wireless Broadband Access

Dr. Michael Meyer
Ericsson Research, Aachen, Germany

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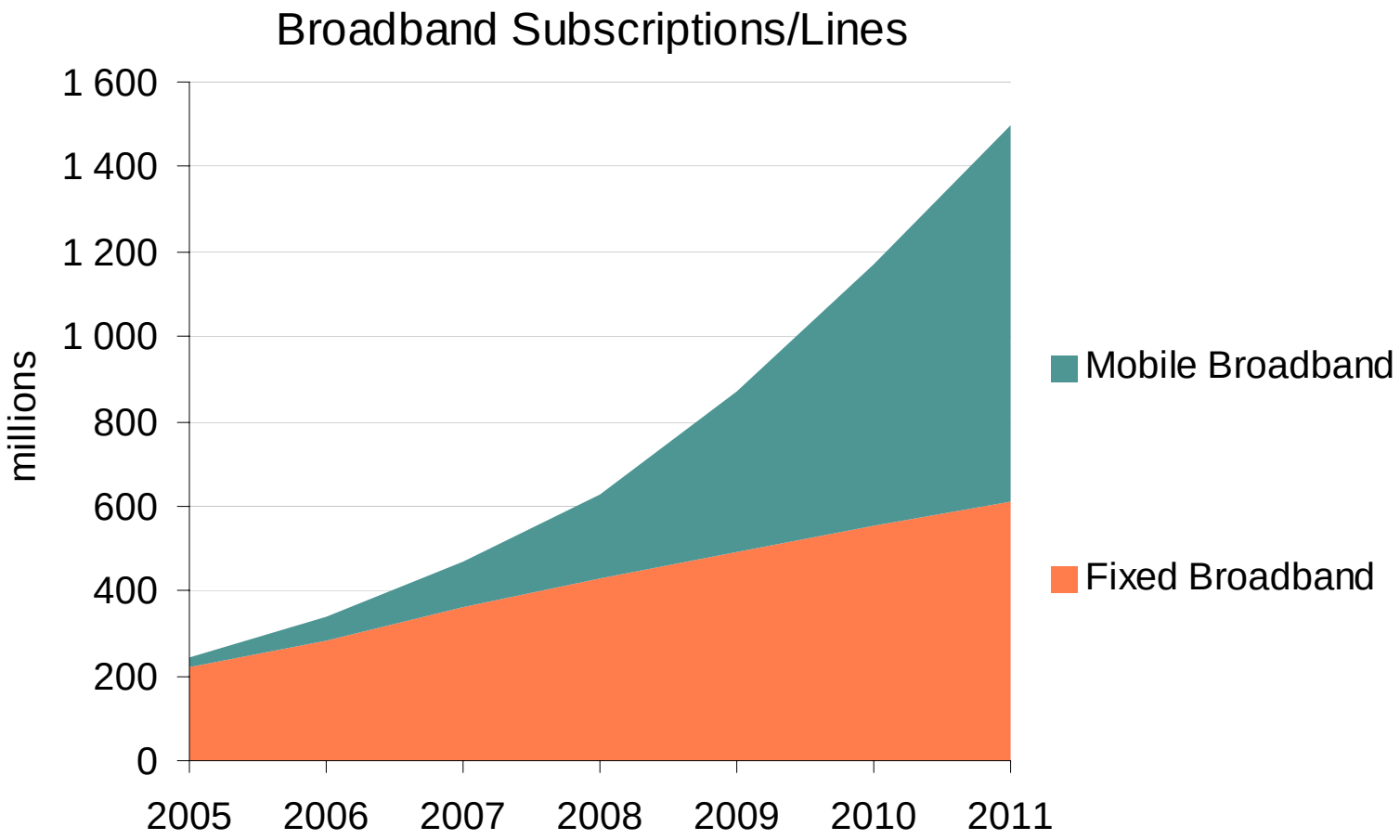
Broadband Subscriptions/Lines



Broadband everywhere!

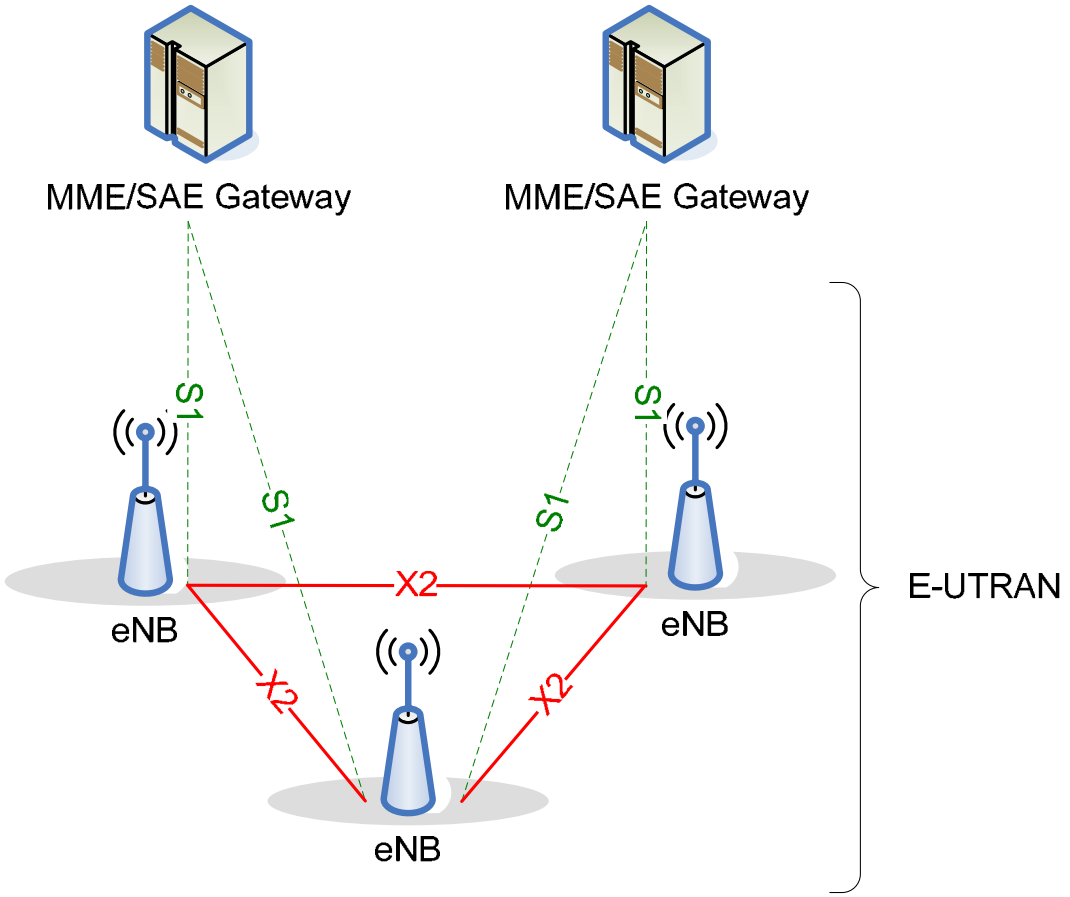
Sources: Ovum, Wireless Intelligence, Strategy Analytics, Gartner and Ericsson calculations/extrapolations

3GPP LTE

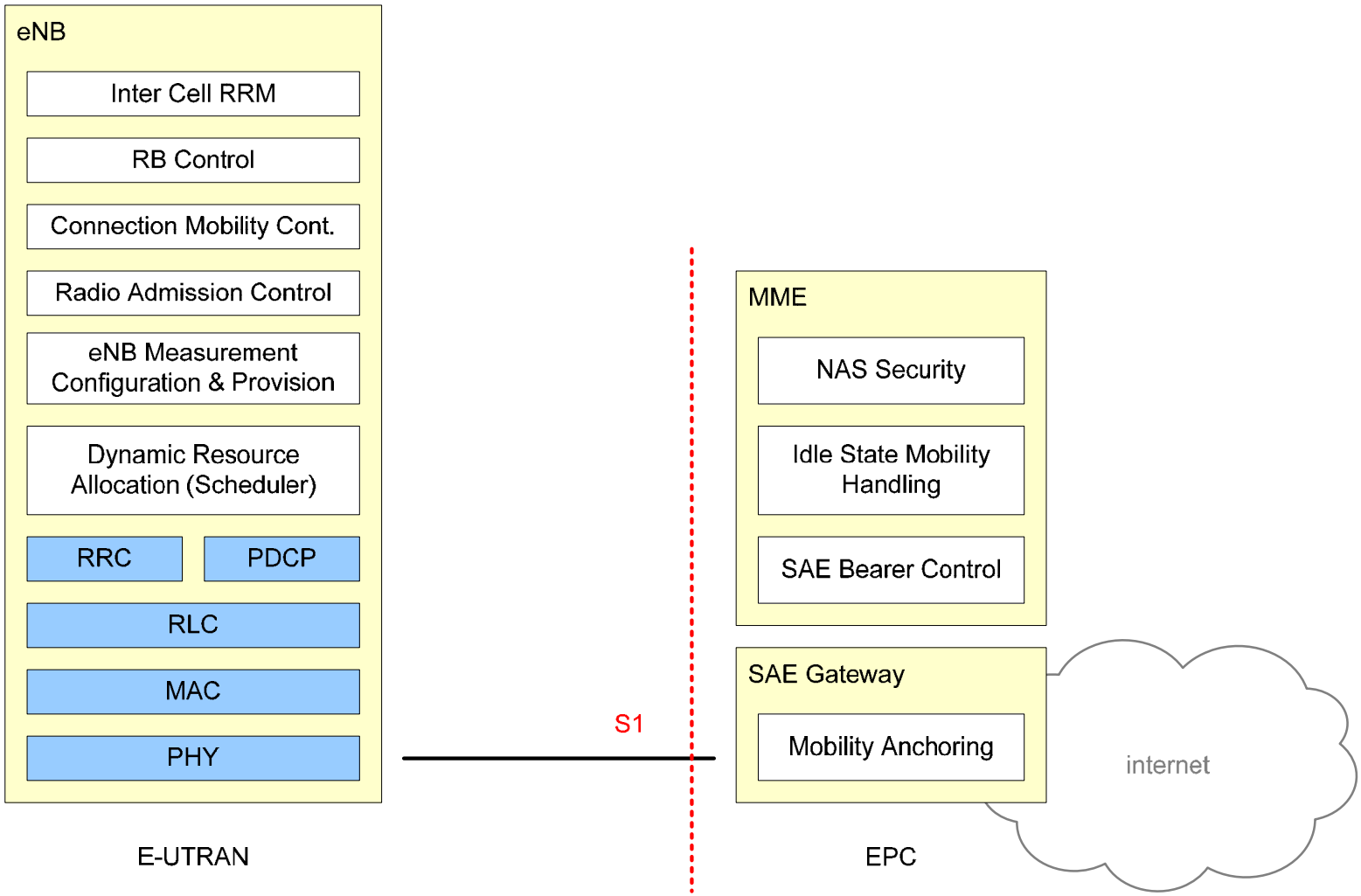
Requirements/Performance Targets

- Focus on PS-domain services
- High data rates
  - Peak data rates: Beyond 100 Mbps (DL) / Beyond 50 Mbps (UL)
- Low latency
  - User plane: Less than 10 ms (RAN RTT)
- High spectral efficiency
  - 3-4 times HSPA Release 6
  - Improved performance for broadcast services
- Spectrum flexibility
  - Deployable in a wide-range of different spectrum allocations of different sizes
  - Same technology for unpaired and paired spectrum (TDD/FDD)

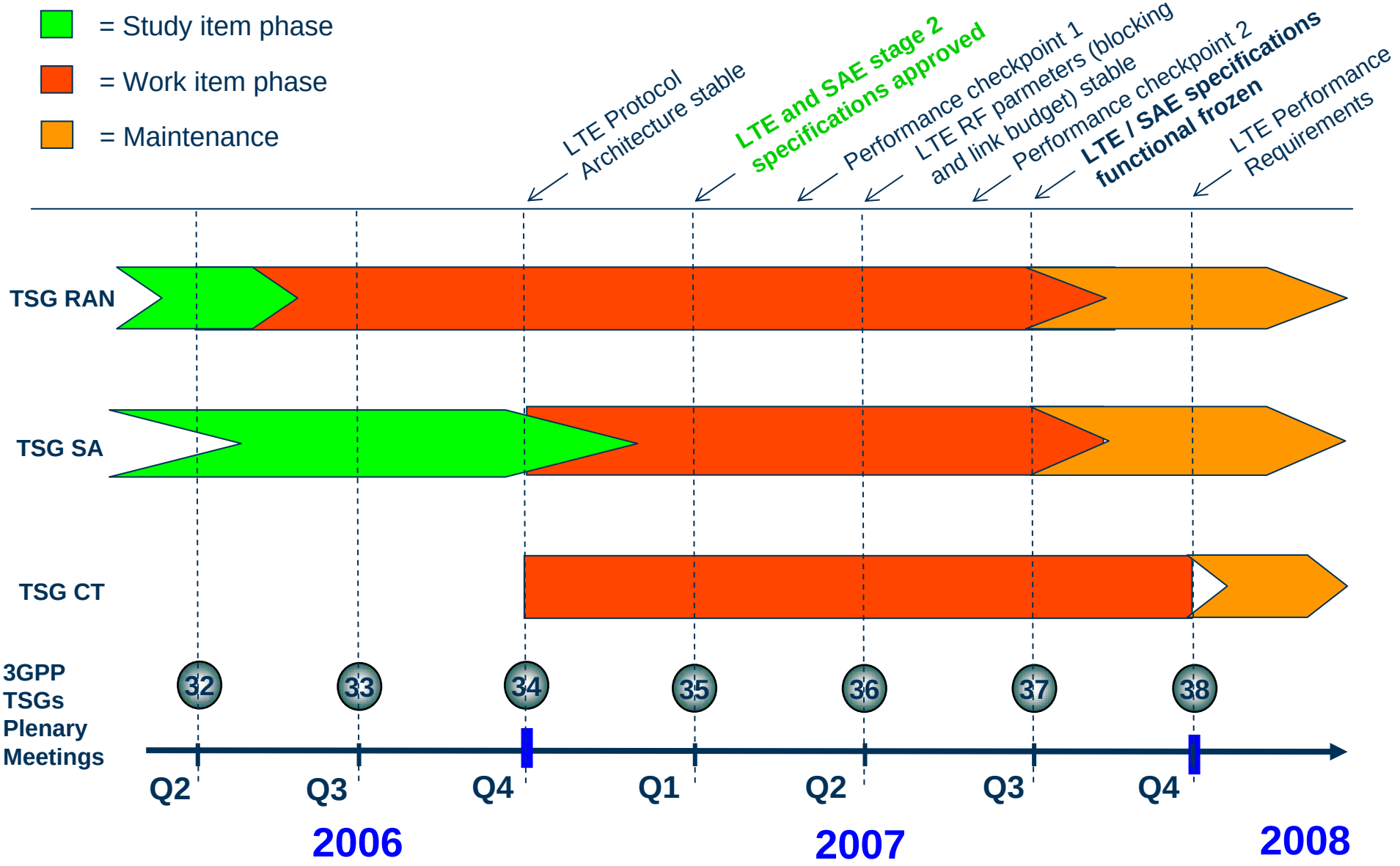
LTE Architecture



LTE Functional Split



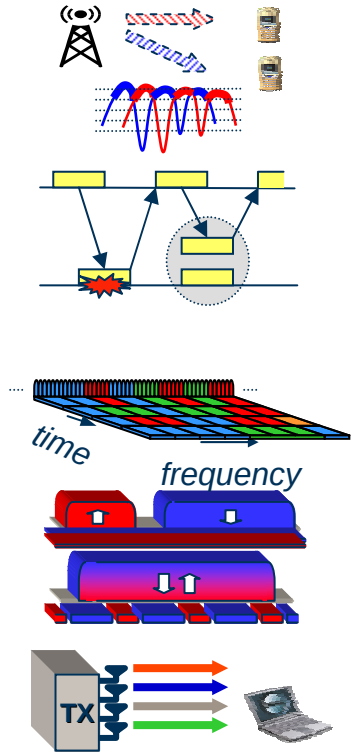
3GPP LTE / SAE High Level Work Plan



HSPA+, LTE, and WiMAX

Common and Distinctive Features

	HSPA+	LTE	WiMAX
MAC	Quality-based scheduling	Quality-based scheduling	Quality-based scheduling
Physical layer	QPSK-64QAM Turbo codes HARQ II	QPSK-64QAM Turbo codes HARQ II	QPSK-64QAM Turbo codes HARQ II
Multiple access	CDMA (DL & UL)	OFDM (DL) FDMA (UL)	OFDM (DL & UL)
Duplex and Bandwidth	FDD 5 MHz	FDD and TDD 1.25-20 MHz	TDD 3.5-10 MHz
Antenna concepts	MIMO Beamforming	MIMO Beamforming	MIMO Beamforming



What’s Next?

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New Challenges are ahead

- LTE Phase II will start in Q4 2007
- IMT Advanced: Proposals are due in 2008/2009

- Drivers
  - Increased Spectral Efficiency
  - Increased Capacity
  - Higher Peak Data Rates
  - Further Decreased Delays
  - Cost-efficient Deployment
- Technologies are needed that support those

Where is Research Input needed?

- Advanced Antenna Solutions
- Interference Coordination, Cancellation & Avoidance
- Relaying Techniques
- Peer-to-Peer
- Simplified Network Operation
- Advanced MBMS Concepts

- Scenarios need to be identified leading to new Deployment Schemes

Some Care is required…

- Often studies are performed with too optimistic assumptions
- Examples:
  - Cost of Control signalling is often underestimated
    - uplink scheduler
    - interference co-ordination
    - advanced MIMO concepts
  - Even if the information is available, it might be out-dated
  - Crosslayer/function-Design is crucial
    - Optimizations by Interference Co-ordination are impacted by Advanced Multi-Antenna Concepts


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